



U.S. DEPARTMENT OF ENERGY

ENERGY

Across The Pond

A Quarterly Update on Joint UK NDA/US DOE Activities and Initiatives

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Introduction

There is a growing appreciation that, with decreasing technology development budgets and increasing pressure on completing the cleanup mission as quickly and cost-effectively as possible, there is significant benefit to be gained from collaboration and joint Technology Development & Deployment, (TDD) efforts between organizations facing similar issues. With this in mind, the US Department of Energy (DOE) and the UK Nuclear Decommissioning Authority (NDA) signed a Statement of Intent (SOI) in March 2007 in which both parties agreed to share information on lessons learned as well as collaborate on the development and application of new technologies and approaches to improve the safety, cost effectiveness and schedule of the cleanup legacy wastes. Since that time, a number of 'Topic Area' discussions have been held, a number of collaborative technical programs started and significant information exchange activities have been completed.

The potential benefits of this relationship are significant, ranging from cost avoidance from identification of an approach to a problem that has been proven elsewhere through to cost sharing and joint development of a new technology to address a common problem. However, the success of the SOI is directly proportional to the level of effort that everyone invests and so we would encourage you to become proactive in making this

collaboration a success by reading this newsletter and making sure that your colleagues are aware of the contents and the SOI, suggesting possible areas of collaboration and participating to the maximum level that your busy day-to-day activities allow. Thank you for your support.

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7th Standing Committee Meeting between USDOE – UKNDA held in Sellafield.

Members of USDOE and UKNDA met at Sellafield in October 2010 to review progress and identify further areas of collaboration under the Statement of Intent between the organizations. The US contingent was led by Yvette Collazo, Director of the Office of Technology Innovation

and Development along with Ana Han ((Lead Foreign Affairs Specialist, Office of Technology, Innovation and Development (DOE)), Steve Schneider (Director, Office of Waste Processing) and Nancy Buschman (Office of Nuclear Materials Disposition). The group spent a day with Dr Adrian Simper (NDA Director of Strategy), John Mathieson (Head of International Relations), Ron Gorham (Head of Supply Chain), Graham Jonsson (Head of Higher Active Wastes) and Melanie Brownridge (Head of R&D) discussing a wide variety of topics ranging from contractor incentivization to fuel drying and decommissioning technologies. Following these discussions the US group toured a number of facilities at Sellafield including B41, THORP, the vitrification plant and one of the current fuel ponds. Additional meetings were also held with members of the Executive Team of Sellafield Ltd and senior representatives of the UK National Nuclear Laboratory (NNL). Yvette Collazo said;

"This has been an exceptionally useful visit to help me and my staff get a much better appreciation of the scale and complexity of some of the issues facing the UK NDA. There is no doubt that this has helped us to put our research and development activities into context and will help us to consider how better we can support collaborative efforts in the future".

The 8th Standing Committee meeting is scheduled to take place during the Waste Management 2011 conference at Phoenix in March 2011.

Topic Area Update

Topic Area Conference calls have continued through the last quarter with the primary focal points being D&D Technologies (sodium passivation and a UK-based demonstration of a DOE funded decontamination approach), Spent Fuel Drying and Management and Hot Isostatic Pressing. The calls are

generally attended by technical experts from the DOE and NDA as well as Site Contractors and National Lab personnel on both sides of the Atlantic. Some of the original Topic Areas (e.g. IX Resin Transportation and Disposal, Tank Corrosion and Structural Integrity) have now reached a conclusion and have been or will be replaced with new areas such as Plutonium Management, Soils

& Groundwater issues and Thermal Treatments.

Overall, the level of technical knowledge shared in these calls has been considerable and there is no doubt that both organizations have benefitted from the efforts to date. The following table provides a summary of the status of the Topic Areas.

Topic Area	Topic Area Leads	Summary of Key Information Discussed
Glass Chemistry	Gary Smith, DOE Jim Marra, SRNL Carl Steele, Sellafield	<p>Three topic area calls held and 3 joint projects have been identified:</p> <p>Spinel formation A PhD student has been appointed. SRNL/PNNL are providing data and reports from internal DOE work as well as input to program planning to leverage existing DOE work and avoid duplication of effort</p> <p>Borosilicate Glass Formulations Work has been subcontracted from SL to SRNL for higher levels of Uranium and Aluminum with cost savings to SL of around \$100k (£60k)</p> <p>Sulfate Solubility SRNL is providing data to University of Sheffield to validate models. If models prove to be effective then this could become another area of collaboration.</p>
Hot Isostatic Pressing	Pramod Mallick, DOE Ken Bateman, INL Graham Jonsson, NDA Mike James, Sellafield	<p>Five topic area calls have been held. Confidentiality issues pertaining to ANSTO reports have been resolved and significant information exchange completed.</p> <p>There was a visit from SL to INL Oct 4-6th 2010 led by Mike James (SL) with Kevin Leyland, Geoff Hobbs, Kevin Gunstone (SL) and Charlie Scales (NNL). It included a comprehensive visit program that included HIP as well as liquid waste treatment and steam reforming of calcined wastes.</p>
D&D Sub Topic 1 Sodium Passivation	Andy Szilagyi, DOE Kirk Dooley, CWI Melanie Brownridge, NDA	<p>Two topic area calls have been held. Excellent information exchange has been obtained on techniques and remote long reach tools. Pictures, videos and data have been sent from Dounreay to CWI.</p> <p>There has been some concerns regarding Intellectual property Rights, but these have now been resolved which will make continuing information exchange more straightforward.</p> <p>CWI/DOE have a demonstration program in planning stages which can be modified to include tests of interest to NDA/UKAEA and there is a possible visit from CWI to Dounreay early 2011. CWI at Idaho have developed a new approach to sodium passivation and is planning trials in 2010/2011 which may be applicable to DSRL/NDA.</p>

D&D Sub Topic 2 Demonstration of DOE Decon Gel	Andy Szilagyi, DOE Melanie Brownridge, NDA Alex Jenkins, Sellafield	<p>Two topic area calls have been held. Discussions identified that SL has used Decon Gel in the past with some success.</p> <p>The initial concept of demonstrating Decon Gel on active facilities at SL has stalled for a number of reasons e.g. waste disposal and scheduling but it is hoped these will be resolved early in 2011.</p> <p>Following discussions between NDA and DOE in October, it is possible that Decon Gel and other decontamination agents may be applied in a 'bake off' series of experiments to identify the optimum series of decontamination agents for different contaminants and substrates</p>
D&D Sub Topic 3 In Situ Entombment (ISD)	Andy Szilagyi, DOE Rich Abitz, SRNL Melanie Brownridge, NDA	<p>One topic area call has been held. The NDA is still at pre-program stage compared with DOE which has been working on ISD for some time.</p> <p>Program plans have been exchanged and reviewed and there appears to be philosophical differences in terms of approach and timescales. However, there is general appreciation that DOE experience will likely be beneficial to NDA.</p>
Fuel Sub Topic 1 Fuel Drying and Storage	Hitesh Nigam, DOE Colin Rhodes, NDA	<p>There have been more than 10 topic area calls held with significant information exchange completed. This culminated in a detailed technical information exchange meeting held in Washington DC Sept 16th in conjunction with semi-annual DOE Nuclear Fuels meeting. The UK attendees were Paul Gilchrist, Danny Fox, Colin Rhodes, Simon Wisbey (NDA); Zara Hodgson (NNL); Collete Hunt (UKAEA Ltd); Neil Blundell (NII). More than 70 people attended main meeting with approximately 20 involved in the DOE/NDA technical exchange (US & UK regulators, NDA and DOE).</p> <p>The original single topic area has expanded to include three new strategic areas related to used fuel which will be additional focal points for detailed technical discussion.</p> <p>For the fuel drying topic area it will address issues such as:</p> <ul style="list-style-type: none"> • Cold vacuum drying • Wet/ Dry transfers • Dry/dry transfers • Timescales for dry storage • Opening / processing packages • Pyrophoric issues during drying • U metal drying including gas production <p>Initial efforts will be focused on identification of dry storage strategy options in both US and UK and identification of overlaps and gaps</p>
Fuel Sub Topic 2 Non Standard Fuels	Debbie Kula, DOE Paul Gilchrist, NDA	<p>The initial collaborative efforts will be focused on:</p> <ul style="list-style-type: none"> • identifying and categorizing existing inventories • identifying current treatment options/storage plans (if any exist) • agreeing on overlaps and gaps • proposing forward approaches to either material transfer and/or technology development

Fuel Sub Topic 3 Ageing Management	Nancy Buschman, DOE Danny Fox, NDA	The initial collaborative efforts will be focused on: <ul style="list-style-type: none"> • Remote monitoring technologies • Remote inspection & repair technologies • On-line testing & sensors (real time)
Fuel Sub Topic 4 Pu Management	Gary Deleon, DOE Paul Gilchrist, NDA	The initial collaborative efforts will be focused on: <ul style="list-style-type: none"> • Sharing information on inventory of non standard used fuels • Sharing information on current storage arrangements • Sharing information on current treatment options • Comparing and contrasting with a view to identifying overlaps and gaps

Group From Sellafield Visits Idaho To Exchange Information On Hot Isostatic Pressing

A Senior level technical group from Sellafield Ltd and the UK National Nuclear Laboratory spent three days at the Idaho National Laboratory in early October to share lessons learned and exchange information on the application of Hot Isostatic Pressing (HIP) to wastes in both the US and the UK. In particular the group discussed:

- Operational experience on both highly active and glovebox application of HIP technology and ancillary pretreatment processes.
- Process control including issues such as can filling, can sealing and swabbing.
- Management of secondary effluents, ventilation systems and monitoring regimes
- The design and build of processing plant for larger can sizes of 20kg

In addition, the group took the opportunity to talk with other INL groups on other areas of potential collaboration including decommissioning, waste characterisation and material processing. Mike James, Head of Technology for Sellafield Ltd said

“We covered a lot of ground on this visit on both HIP and other areas of interest to Sellafield and the NDA and we are very grateful to Idaho National Laboratory for their openness and willingness to support the Bilateral Agreement between DOE and the NDA”.



Sellafield visitors from L-R: Kevin Leyland (SL); Charlie Scales (NNL); Mike James (SL); Jeff Hobbs (SL); Kevin Gunston (SL); Ken Bateman (INL)

Ken Bateman, who leads the HIP activities at the INL said

“We are very grateful to Mike and his colleagues for visiting and feel we made good progress in getting a better understanding of one another’s programs that will enable us to share lessons learned and make progress in the development and implementation of this exciting technology”.

Glass Chemistry Collaboration Update

The glass chemistry collaboration between Sellafield and Savannah River National Laboratory is progressing very well and is a good example of how the UK and US can work together to the benefit of both. The contract was placed in August 2010 and is very cost effective since SRNL have the facilities and expertise already in place. Significant savings are being made to deliver this scope of work.

Dave Peeler (SRNL) and his team have prepared a range of different borosilicate glass compositions containing higher levels of uranium and aluminium to simulate the composition of ‘Butex’

HLW which will start to be processed during 2012. The experimental programme is expected to be completed before the end of the year. Preliminary results have validated an earlier study with the UK NNL. The results will be used to devise the optimal blend ratio to feed Butex HLW with Magnox HLW and incorporation rate.

In addition, two PhD students have been recruited - James Stevens started his PhD on spinel phase formation in HLW glass in September 2010. A meeting will be arranged in January to visit the Immobilisation Science Laboratories at Sheffield University to discuss the focus and define the objectives for the first year of research, and James Miller started a PhD on melt modelling behaviour at Sheffield university. A meeting has been arranged for 17th January for James and Karl Travis/Russell Hands to visit Sellafield to discuss the focus and define the objectives for the first year of research. It is intended to present the Glass Chemistry research work at a number of international conferences to be held during 2011, these include:

- 2011 Lomonosov International Conference of the Chemistry of Glasses and Glass Forming Melts, Society of Glass Technology in Oxford, UK, 4-8 September 2011.
- International conferences on environmental remediation and radioactive waste management organized by the ASME and other technical societies.
- ICEM'11 will be held Sept 25 - 29 in Reims France.
- MRS 2011 - XXXV International Symposium on Scientific Basis for Nuclear Waste Management will be held in Buenos Aires, Argentina from October 2nd to October 7th, 2011.

International Partnership Workshop on DOE Used Nuclear Fuel & High Level Waste

A workshop was held in Crystal City, Arlington, VA on Sep 14th to 16th 2010 to discuss and debate a number of aspects associated with used nuclear fuel including storage, transportation, disposal and security aspects. There was an excellent representation from a number of countries including Canada, India, Australia, US and the UK. The representatives included Federal, Site Contractors and Regulators.

The first two days were a combination of presentations, panel sessions and networking. Day 1 set the framework and context for used fuel within the US and UK. The opening speaker was Joyce Connery, the Senior Advisor to DOE Deputy Secretary Daniel Poneman, who spoke about the policy decisions concerning Yucca Mountain and the role that policy plays in the overall debate. This was followed by an update on the Blue Ribbon Commission on America's Nuclear Future (BRC) and information on the role the GAO (Government Accountability Office) plays in reviews and audit. DOE's Office of Nuclear Energy, NE then presented their work in used fuel followed by a practical example of fuel drying and storage for commercial reactors given by Matt Marston from TSSD Services Inc. In the afternoon, there were presentations from the US and UK nuclear regulators on their perspectives

and priorities followed by the DOE's regulatory perspective and then the role DNFSB plays in the overall review process.

Day 2 discussed activities that were happening on the various Sites related to fuel which included presentations from Hanford, Idaho, Savannah River and the UK (Sellafield and Dounreay). The UK presented an overview of their fuel management process including the historical context of reprocessing. Additionally, Australian and Canadian representatives presented their fuel management work going on in their countries and there was a presentation on fuel management in India by an expert on this subject. NNSA presented the work they were undertaking regarding Global Threat Reduction Initiative (which included discussions of Foreign Research Reactor Program and Gap Material) and the day was completed with an overview of the proposed technology development work for FY11 in EM30.

The two days gave an excellent overview of the considerable work that is being done across the different agencies in the US, the UK and elsewhere. The proceedings are available at <http://nsnfp.inel.gov/program/>. It was clear from these two days that there were many areas for potential collaboration and the purpose of Day 3 (half day session) was to identify, more specifically, potential areas of collaboration between the US and UK.

Day 3 was a small group (circa 25) of specially-invited attendees covering all of the key stakeholders from the main US sites, Federal staff, US and UK regulators and UK Site and Federal representatives. The purpose of this smaller, more focused, meeting was to identify areas of complementarity, overlap and technology development opportunities which could become the subject of subsequent activities under the Bilateral Agreement between USDOE and UK NDA.

NWTRB Discusses Technical Lessons Gained From NDA High-Level Nuclear Waste Disposal Efforts To Date



The U.S. Nuclear Waste Technical Review Board met in Dulles, Virginia, on October 26, 2010, to discuss technical aspects of the U.S. Department of Energy's (DOE) activities over the last 20 years related to managing and disposing of spent nuclear fuel and high-level radioactive waste. The Board was established as an independent federal agency to provide objective expert advice to Congress and the Secretary of Energy on technical issues and to review the technical validity of DOE activities related to implementing the Nuclear Waste Policy Act.

Former managers, contractors, and scientists associated with the Yucca Mountain program discussed their experiences at the meeting. The Board also invited representatives from affected units of governments in Nevada to provide their perspectives on technical oversight.

In addition, representatives from Sweden (Olof Soderberg, Consultant), the UK (John Mathieson, NDA), Germany (Enrique Biurrun, DBE Technology) and France (Gérald Ouzounian, ANDRA) shared their own experiences of trying to implement geological disposal. Further details of the meeting including transcripts and presentations can be found at www.nwtrb.gov.



Attendees at Technology Innovation and International Partnership Workshop

**Richard Abitz From SRNL
Delivers Key Address At 2010
UK Decommissioning And
Waste Management Conference
In Penrith, Cumbria**



The Rheged Centre, Penrith Cumbria

Dr. Rich Abitz from the US Department of Energy's Savannah River National Laboratory delivered a key address entitled "Decommissioning Highly Contaminated Nuclear Facilities at the United States Department of Energy Sites" at the UK D&WM conference in Penrith in November. The presentation generated significant dialogue from the attendees who represented a diverse group of government, industry, regulatory and stakeholder organizations. In

particular the group acknowledged that the challenges present at DOE sites are very similar in many ways to those in the UK and that safe and responsible decommissioning of old facilities is a positive and necessary requirement to help stimulate new nuclear build in the UK. There was also consensus that, while high-risk facilities will receive the majority of funds in the coming decade, there is still uncertainty within the government and private sector whether the funding will be sufficient to address all high-risk facilities. This potential shortage of funding further illustrated the need for international collaboration on research and development, present deployment technologies and financial strategies to maximize the return on available decommissioning funds across the globe.

Upcoming Events: Waste Management Conference in Phoenix

The annual Waste Management (WM) Conference, presented by WM Symposia (WMS), is widely regarded as the premier international conference for the management of radioactive material and related topics. WMS is a non-profit organization dedicated to education and opportunity in waste management.

The annual WM2010 conference attracted over 2,000 registrants from over 35 countries and provided significant opportunities for networking, professional growth and education - as well as business opportunities.

The conference is attended by decision makers, project managers, and technical and procurement specialists representing the government and private organizations undertaking the global tasks of radioactive material management, decommissioning and site remediation.

WM2011, the conference's 37th year, is expected to attract representatives from over 35 countries, presenting more than 500 papers in over 100 technical sessions. WM2011 will be held February 27 - March 3, 2011 at the Phoenix Convention Center's West Building. The on-line Technical Program is available on the web www.wmsym.org.

For further information please contact

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